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Applicant:	Alekscy E. Bolotnikov et al.	Art Unit:	2815
Serial No.:	09/933,349	Examiner:	Jerome Jackson, Jr.
Filed:	February 23, 2001		

Title: INDIUM FEATURES ON MULTI-CONTACT CHIPS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attached to this facsimile communication cover sheet is a Reply Brief, faxed this 16th day of June, 2006, to the United States Patent and Trademark Office.

Respectfully submitted,

Date: June 16, 2006

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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REPLY BRIEF

Pursuant to 37 C.F.R. § 41.41, Applicant responds to the Examiner's Answer as follows.

Anticipation Rejection

At page 4, lines 9-10, Examiner's Answer contends that indium bumps having "any height greater than 9 microns to the example of 115 microns is so inherent and obvious to the problem solving of Hu as to be basically anticipated." Applicant respectfully disagrees.

Claims 1 and 4 are not expressly anticipated because Hu does not disclose indium bumps having a height of 15 to 100 microns. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."

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June 16, 2006
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Signature

Julie H. Giordano
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Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631 (Fed. Cir. 1987). Claims 1 and 4 relate to devices that include indium bumps having a height ranging from 15 to 100 microns. Hu discloses an indium structure having three elements, 40, 46, 50, which separate a detector and a chip. The height of indium column 40, before welding, is 115 microns and the heights of elements 46 and 50 are unspecified. Although the total height of Hu's three element indium structure is unspecified, the height of one element, indium column 40, before welding, is greater than the largest claimed height. Consequently, there is no reason to conclude that the combined height of elements 40, 46, and 50 is within the claimed range. In fact, Hu's bumps are almost certainly outside the claimed range. Thus, Hu does not expressly disclose a pixilated semiconductor detector or a VLSI chip with indium bumps having a height of 15 to 100 microns, as recited in claims 1 and 4. Certainly this is not "inherent" as would be required for anticipation.

Claims 5 is not expressly anticipated because Hu does not disclose a chip separation distance of 15 to 100 microns. Again, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros.*, 814 F.2d at 631. Claim 5 relates to a hybrid

detector in which surfaces of a pixilated detector and a VLSI chip are separated by 15 to 100 microns. Hu discloses a chip and a detector separated by five elements, 40, 46, 47, 48, 50. The height of indium column 40, before welding, is 115 microns but the heights of elements 46, 47, 48, and 50 are unspecified. Although the total distance between Hu's chip and detector surfaces is unspecified, the separation created by indium column 40 alone, before welding, is greater than the largest claimed separation distance. Consequently, there is no reason to conclude that the separation distance between the detector and the chip, created by the combined height of elements 40, 46, 47, 48, and 50, is within the claimed range. Thus, Hu does not expressly disclose surfaces of a pixilated detector and a VLSI chip separated by 15 to 100 microns, as recited in claim 5.

Furthermore, the claimed subject matter is not inherently anticipated by Hu because the claimed range is not necessarily disclosed and any conclusion to the contrary is improperly based on probability or possibility. "To establish inherency, the extrinsic evidence 'must make' clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not

sufficient." *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). In this case, the missing descriptive matter is indium bumps having heights ranging from 15 to 100 microns and chip surface separation distances of 15 to 100 microns.

Applicant respectfully contends that the Patent Office has failed to show that indium bumps having a height ranging from 15 to 100 microns is necessarily present in Hu. As discussed above, the total height of Hu's three element indium structure is unspecified. However, the height of one element, indium column 40, before welding, is greater than the largest claimed height. Consequently, concluding that Hu discloses indium bumps having a height within the claimed range is based on the *probability or possibility* that Hu's technology *could* make smaller indium bumps, not on Hu's actual disclosure. Therefore, Hu does not inherently disclose a pixilated semiconductor detector or a VLSI chip with indium bumps having a height of 15 to 100 microns, as recited in claims 1 and 4.

Likewise, Applicant respectfully contends that the Patent Office has failed to show that a chip surface separation distance of 15 to 100 microns is necessarily present in Hu. As discussed above, the total distance between the surfaces of Hu's chip and detector, determined by the combined height of elements, 40, 46, 47, 48, and 50, is unspecified. However, the separation created by indium column 40 alone, before welding, is

greater than the largest claimed separation distance. Consequently, concluding that Hu discloses chip surface separation distances within the claimed range is based on the *probability or possibility* that Hu's technology *could* make smaller chip surface separation distances, not on Hu's actual disclosure. Therefore, Hu does not inherently disclose surfaces of a pixilated detector and a VLSI chip separated by 15 to 100 microns, as recited in claim 5.

Finally, at page 4, lines 4-5, Examiner's Answer is understood to contend that the claimed invention is anticipated by the "problem solving strategy" of Hu.

Applicant respectfully contends that the problem solving strategy of Hu does not anticipate the claimed invention. A patent is not anticipated simply because it solves the same problem as the prior art. *See In re Self*, 671 F.2d 1344, 1351 (C.C.P.A 1982) (indicating that whether the prior art solves the same problem as the claimed invention is not germane to anticipation rejections). Instead, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros.*, 814 F.2d at 631. Hu's "problem solving strategy" is not an element of claims 1, 4 or 5. Therefore, the problem solving strategy of Hu is irrelevant.

With respect, this is effectively an impermissible attempt to ignore the specific claim language.

Accordingly, the anticipation rejections of claims 1, 4 and 5 are improper and must be withdrawn.

Obviousness Rejection

At page 3, line 8, and page 7, lines 4-5, Examiner's Answer contends that the claimed subject matter is obvious over Hu. Applicant respectfully disagrees.

An invention is obvious when "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103(a). This inquiry is governed by the objective standard identified in *Graham v. John Deere Co.*, 383 U.S. 1 (1996).

Applicant respectfully contends that Examiner's Answer failed to establish that Hu enables a person of ordinary skill to make the claimed invention. References relied upon to support a rejection under 35 U.S.C. § 103 must place the claimed invention in the possession of the public. *In re Hoeksema*, 399 F.2d 269, 274 (C.C.P.A. 1968); *In re Brown*, 329 F.2d 1006, 1011 (C.C.P.A. 1964). Thus, obviousness rejections are overcome when

the prior art does not disclose or render obvious a method for making the claimed invention. *In re Hoeksema*, 399 F.2d at 274.

Both Hu and Applicant recognize that indium bumps of all sizes cannot be obtained with every technique. For example, both Hu and Applicant teach that indium bumps made by vapor deposition have a maximum height of 9 to 12 microns and note the difficulty, in general, of making indium bumps larger than 9 to 12 microns in height. Hu also teaches indium bumps made using an integrated circuit connector or interconnect pad having a height equal to the combined height of elements, 40, 46, and 50; wherein the height of indium column 40 alone, before welding, is 115 microns. Indeed, a person of ordinary skill in the art cannot simply make indium bumps of any size using any technique.

Nevertheless, the present rejection asserts that Hu's technology is capable of making devices outside of Hu's disclosure. However, Examiner's Answer provides no support for this assertion. For example, Examiner's Answer failed to show the existence of smaller integrated circuit connectors or interconnect pads, or that Hu's technology would work with smaller integrated circuit connectors or interconnect pads. In the absence of such a showing, there is no reason to believe that Hu's technology allows a person of ordinary skill in the art to make the claimed subject matter. Conclusion to the contrary requires capricious and arbitrary speculation.

At page 4, lines 11-12, and page 5, lines 3-4, Examiner's Answer is understood to contend that Applicant is presuming "stupidity rather than skill" in the art and/or that no one has any skill in the art. Applicant respectfully disagrees.

Applicant respectfully submits that Examiner's Answer failed to objectively show that Hu enables a person of ordinary skill in the art to make the claimed subject mater. Applicant notes that, "[t]he importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry." *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). At page 4, line 3, Examiner's Answer asserts that a "fair reading of Hu" places a person of ordinary skill in possession of the claimed invention. However, Applicant respectfully submits that this assertion requires the subjective assumption, without any objective support, that Hu's technology is capable of producing the claimed invention. As discussed above, there is no reason to believe that Hu's technology allows a person of ordinary skill in the art to make the claimed subject matter. Therefore, Applicant respectfully requests that the claims be examined under an objective standard.

At page 6, lines 10-13 Examiner's Answer is understood to contend that the difference in compliances and capacitances between Hu and the claimed invention is irrelevant because

Applicant has not claimed compliances or capacitances. Applicant respectfully disagrees.

Both Hu and Applicant teach that smaller indium bumps have less desirable compliances and capacitances than larger indium bumps and increase the deleterious results of thermal fatigue. Applicant respectfully submits that these teachings are relevant to the motivation of a person of ordinary skill in the art.

In essence, Examiner's Answer contends that it would be obvious for a person of ordinary skill in the art to contradict the alleged advantages of Hu's teaching. However, it is well established that proceeding contrary to accepted wisdom in the art is evidence of non-obviousness. *In re Hedges*, 783 F.2d 1038, 1041 (Fed. Cir. 1986). Hu clearly states, and Examiner concedes, that the accepted wisdom in the art is to make the tallest indium bump height attainable. Taller indium bumps increase compliances, lower capacitances and avoid the deleterious results of thermal fatigue. Upon reviewing Hu, a person of ordinary skill in the art would recognize that the claimed subject matter would be expected to result in lower compliances, higher capacitances and increased thermal fatigue, vis-à-vis Hu's indium bumps. Therefore, even if Examiner's Answer establishes a prima facie case of obviousness, which Applicant does not concede, Applicant respectfully submits that

the prima facie case is rebutted because Hu teaches away from the claimed subject matter.

Accordingly, the obviousness rejections of claims 1, 4 and 5 are improper and must be withdrawn.

For these reasons, and the reasons stated in the Appeal Brief, Applicant submits that the final rejection should be reversed.

Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: June 16, 2006

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